6 inches. Its enlarged and extremely elastic pharynx commences with the enormous sac, or air-vessel, which extends about 20 inches from the snout. It is so delicate that it could not be fully inflated, but when partially so, measured about 9 inches in circumference, below its union with the tail, and its greater diameter, including the slender body of the animal, 4 inches.

At about an inch from its termination it is perforated by the rectum, and its tenuity rendered that and the other intestines easily traced. They appear to be sustained beneath the very imperfect ribs by a membranous expansion, not being affected in position by inflation of the sac.

The skin all over the body is particularly soft and shining. The spiracula are large, irregularly oval, and unprovided with external rays, and their edges partially conceal on each side three tufted branchiæ, at about 5½ inches from the snout. The fins are all very small. In the pectoral ones is a peculiarity not found in other apodal genera, being chiefly composed of an adipose disc, which is terminated and nearly surrounded by a narrow radiated membrane, instead of the latter originating from the body immediately. The tail, after the termination of the dorsal fin, becomes a slender tape-like filament, nearly 20 inches longer; and above this point some minute filaments take their growth from it. The anal fin commences where the sac terminates, and ends 14 inches from the end of the tail.

The most curious parts of the animal are, however, the head and jaws. It has no tongue; the teeth are disposed in a single row above and below. The ossa palati are destitute of teeth, and the jaw-bones are so long, and their articulation so loose, as to be susceptible of distention beyond any other animal, not excepting the rattle-snake; and when fully distended they describe a large circle, and appear but the opening of an ample sac.

The author illustrates his description by three figures, and concludes by observing that the Ophiognathus is one of the most voracious of the inhabitants of the ocean. Its entire form would indicate great swiftness of motion, performed doubtless by the same sinuous inflections in water, which excite our admiration in serpents on land. In what manner its pouch is employed in its economy he does not attempt to determine, nor to decide whether it be capable of secreting the contained air, or whether water be allowed to enter it.

An Examination into the Structure of the Cells of the Human Lungs; with a view to ascertain the Office they perform in Respiration. By Sir Everard Home, *Bart. V.P.R.S. Illustrated by Microscopical Drawings from the Pencil of* F. Bauer, *Esq. F.R.S.* Read February 8, 1827. [*Phil. Trans.* 1827, *p.* 58.]

The author commences this paper by remarking that the subject of respiration has been hitherto regarded as belonging rather to chemistry than to anatomy; but that he finds reason to believe that process to be more simple than is imagined, and more within the

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reach of anatomical than chemical investigation. The present theory among chemists, he states, is, that respiration decarbonizes the blood, a volume of oxygen and nitrogen being at each inspiration received into the lungs, and returned, measure for measure, the oxygen only being partly converted into carbonic acid; thus proving, as they suppose, that no part of the atmospheric air breathed is retained.

This theory he considers as satisfactory, supposing it supported by the structure of the lungs themselves, and taking it for granted that the blood requires no other change for its purification. But when it was devised, no accurate examination of the cellular structure of the lungs had been set on foot; and it is the object of this paper to explain their mechanism, and see how far it is fitted for the processes this theory requires.

The author began by inquiring into the circulation of blood through the lungs; and by the aid of Mr. Russel procured injections of their veins and arteries, capable of being rendered objects of microscopic investigation by Mr. Bauer.

The first fact discovered was, that though an injection introduced by the pulmonary artery was found to return by the trunks of the pulmonary veins, yet, when thrown in by the veins, it does not return by the arteries.

The next fact ascertained was, that the distention of the air-cells produces an interruption between the arterial and venal circulation, the blood being carried no further than the small arterial branches surrounding the air-cells.

The author then proceeds to describe the air-cells and parts surrounding them, from drawings made by Mr. Bauer. The branches of the pulmonary artery, accompanied by larger and more numerous branches of the pulmonary vein, are seen ramifying behind the internal membrane of each cell. The latter have valves at regular intervals, and there are also numerous absorbents supplied also with valves. The injection was found to have stopped short of the termination of the artery, and the space beyond to be filled with gas.

After this description, and after expressing his obligations to Mr. Dollond for his improvement in the microscopes used by Mr. Bauer, the author proceeds to deduce his conclusions, which are unfavourable to the received doctrine of simple decarbonization, conceiving the structure thus developed as better adapted to receive supplies from the atmosphere, and transmit them to the heart. He considers that the carbonic acid, detected by Professor Brande, in urine and perspirable matter, must have been formed in the blood circulating through the arteries, and have derived its oxygen from the lungs. He considers, further, that the carbonic acid carried off in respiration, is furnished from such venous blood as has acquired it during the process of digestion; having known on a former occasion that soon after that process has been begun, the oxygen employed in it unites with carbon.

He finally remarks that, for carrying on the functions of life, and for supplying oxygen and removing carbon, respiration is necessary, but is not required for the simple continuance of life when no action is going on; and illustrates this opinion by the instance of the common garden snail.

Remarks on a Correction of the Solar Tables required by Mr. South's *Observations. By* G. B. Airy, *Esq. M.A. Fellow of Trinity College, Cambridge, and Lucasian Professor of Mathematics in the University of Cambridge. Communicated by Dr.* Young, *F.R.S., &c.* Read February 15, 1827. [*Phil. Trans.* 1827, *p.* 65.]

The discordancies observed by Mr. South between the sun's right ascension, as deduced from observation, and those given in the Nautical Almanac, follow a law so simple as not to allow of their being regarded as errors of observation, or arising from any casual cause, but justify us in attributing them to imperfections in the solar tables, with the exception of three days, in which there seems to be some ground to suspect error of computation.

A single inspection of these discrepancies, Mr. Airy observes, suffices to show that they arise almost entirely from an error in the epoch, and an error in the place of the perigee. From the peculiar form of the tables in Vince's Astronomy, which give great facility to the introduction of an error in the excentricity, he was induced at first to suspect that one might exist; but on calculation found the error in the equation of the centre so small as to be entirely insensible. He then proceeds to detail the process by which, from Mr. South's observations, he has deduced the amount of the several errors, which consist in regarding the epoch, the mean anomaly, and the equation of the centre, as erroneous by three very small unknown quantities, and forming as many equations of condition for determining them as there are observations. These combined and resolved, so as to give the most probable result, lead to the conclusions, first, that the correction of the equation of the centre is evanescent; secondly, that the epochs of the sun must all be increased by 9″, and the epochs of the perigee each by 1′ 48″.

On the mutual Action of the Particles of Magnetic Bodies, and on the Law of Variation of the Magnetic Forces generated at different Distances during Rotation. By S. H. Christie, *Esq. M.A. F.R.S.* Read February 15 and 22, 1826. [*Phil. Trans.* 1827, *p.* 71.]

The results obtained by the author, described in a former communication, when a copper disc was made to revolve under a magnetized needle, appearing to him not likely to lead to an accurate knowledge of the law of magnetic attraction, developed during rotation, from the effect of lateral attraction; he was induced to resume the inquiry, substituting a ring for a disc, expecting that, as no lateral forces would here be called into action, the results would be more uniform, and in this expectation he was not disappointed. One of the first phenomena encountered by him in this research, was a very